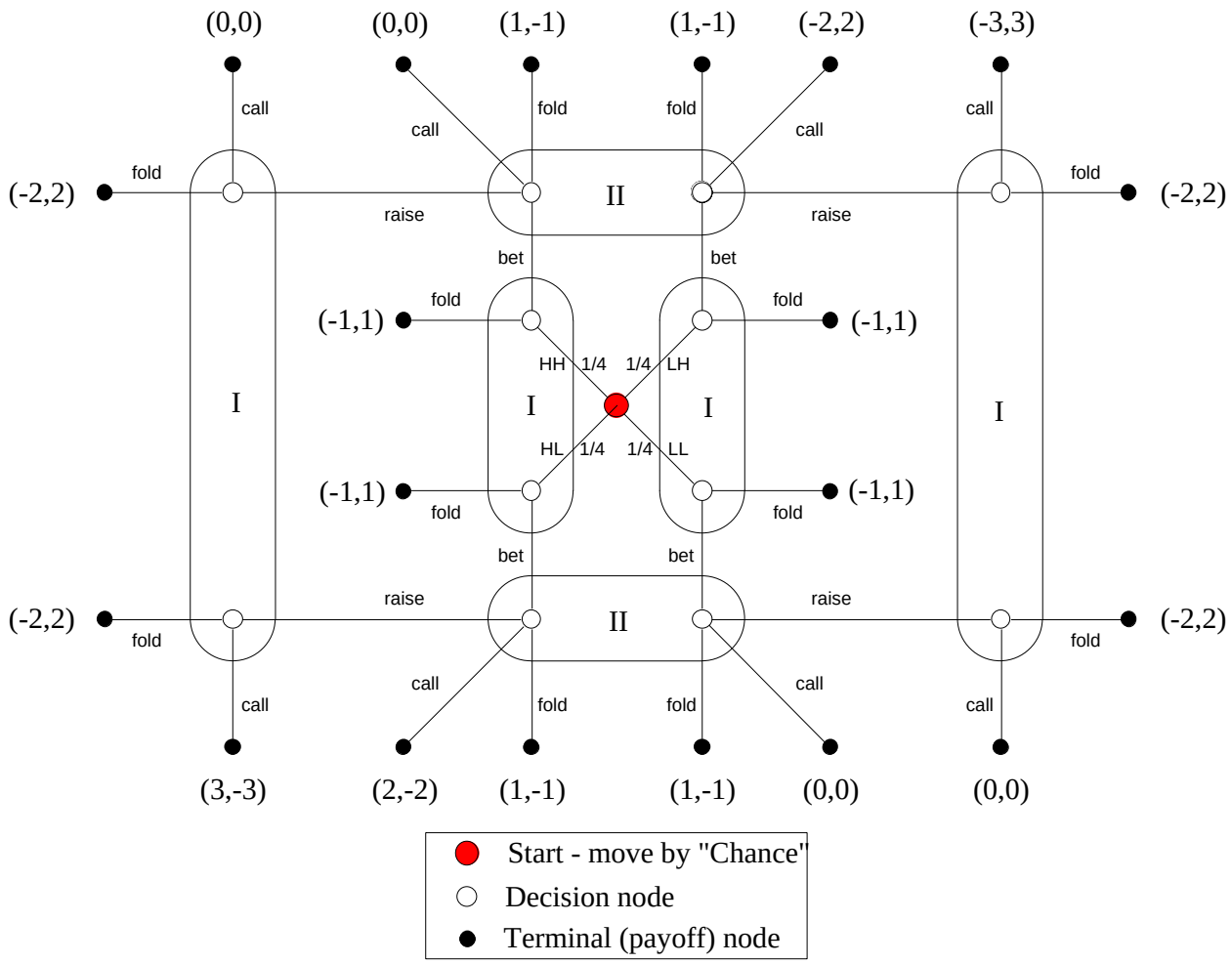


Player I's Strategies

Player II's Strategies

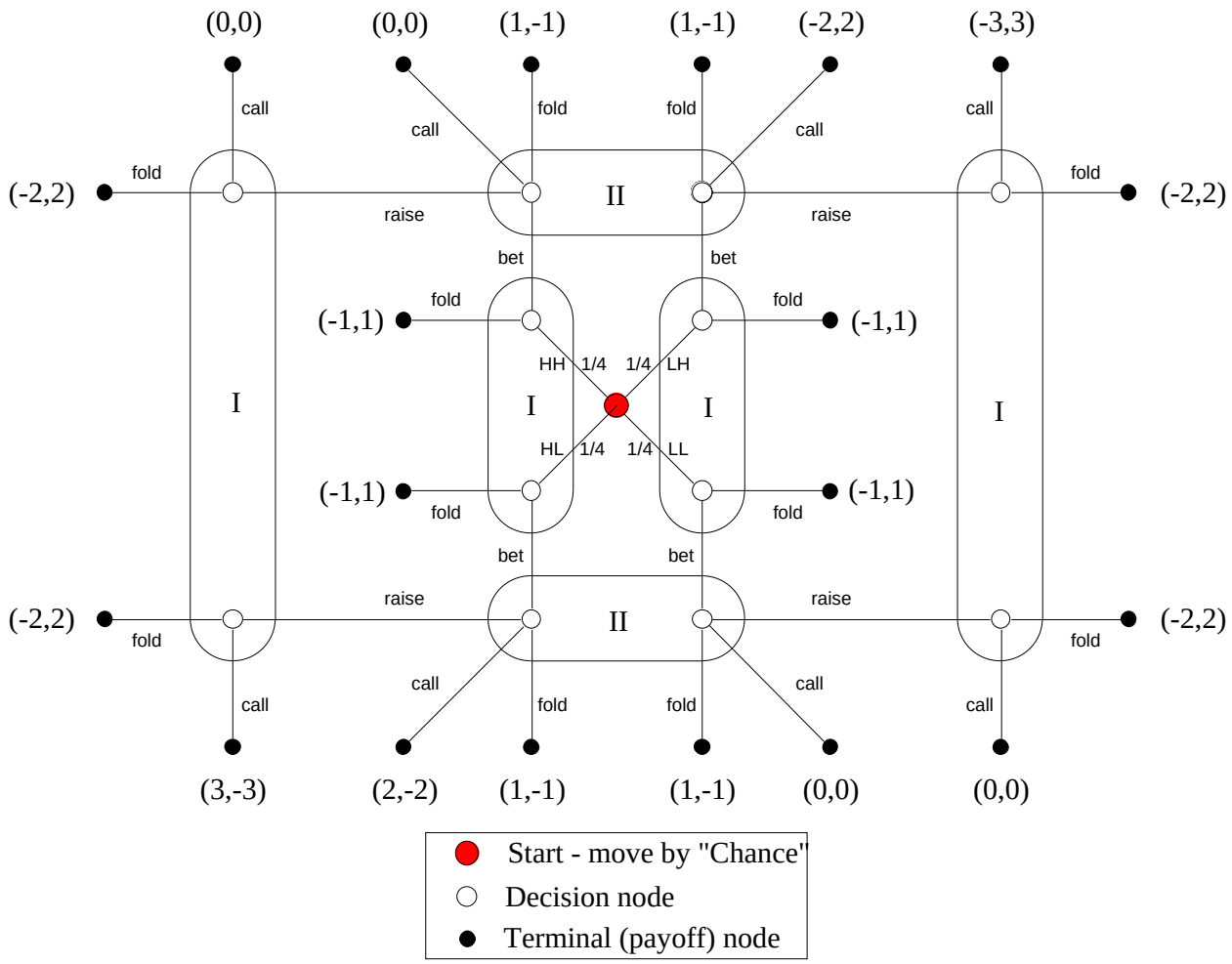
Pure

HbcLbc
HbcLbf
HbcLfc
HbcLff
HbfLbc
HbfLbf
HbfLfc
HbfLff
HfcLbc
HfcLbf
HfcLfc
HfcLff
HffLbc
HffLbf
HffLfc
HffLff

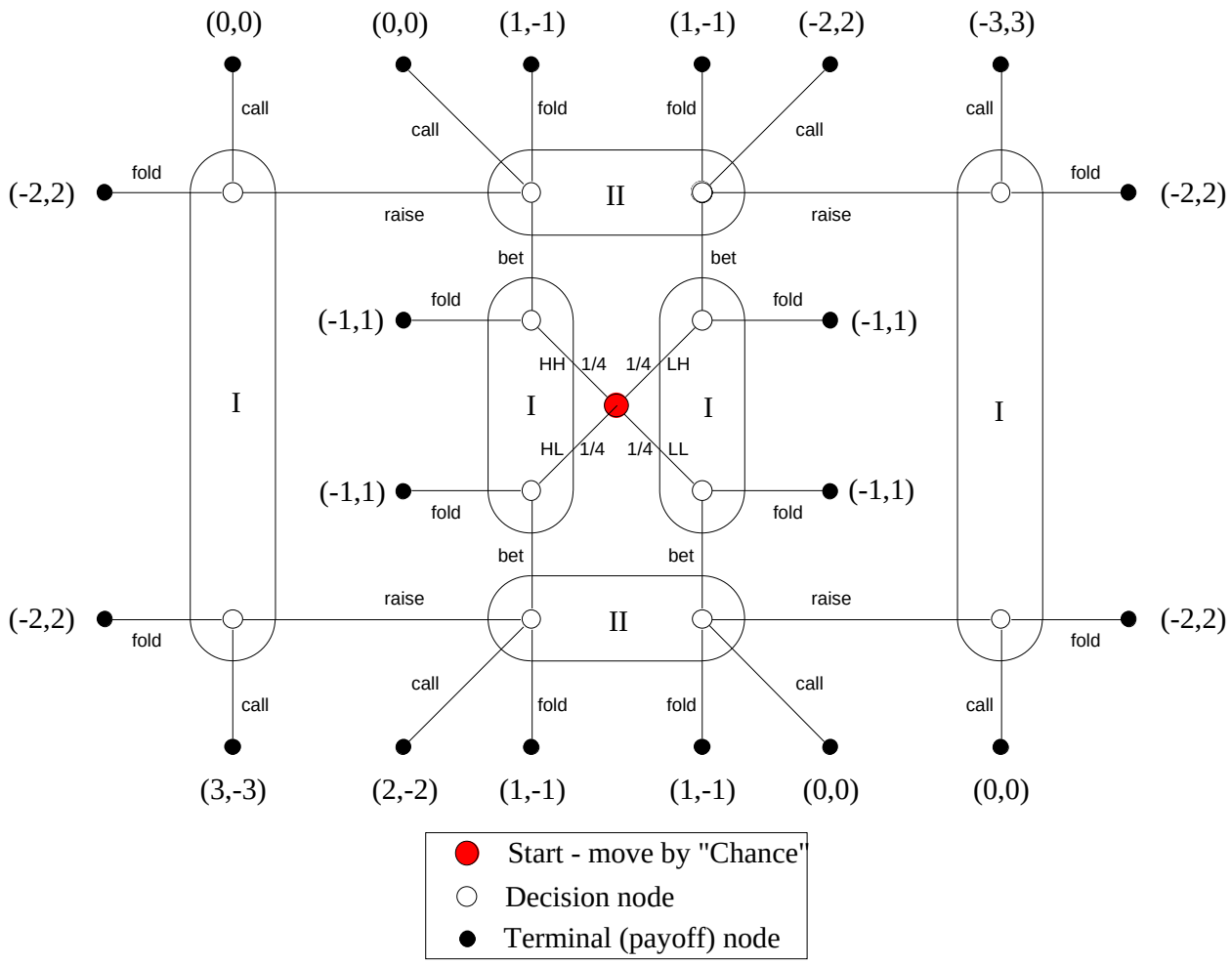
The notation used here (for Player I's strategies) is completely ad hoc. The capital letters are just reminders, and indicate the card held by Player I. The lowercase letters correspond to the player's choice of action in each of the four "situations" the player might be in at some point in the game.

For example, HbcLbf represents the (single) strategy:

Situation 1 "hold H": {**bet**, fold}
Situation 2 "hold H, already bet and heard 'raise'": {**call**, fold}
Situation 3 "hold L": {**bet**, fold}
Situation 4 "hold L, already bet and heard 'raise'": {call, **fold**}



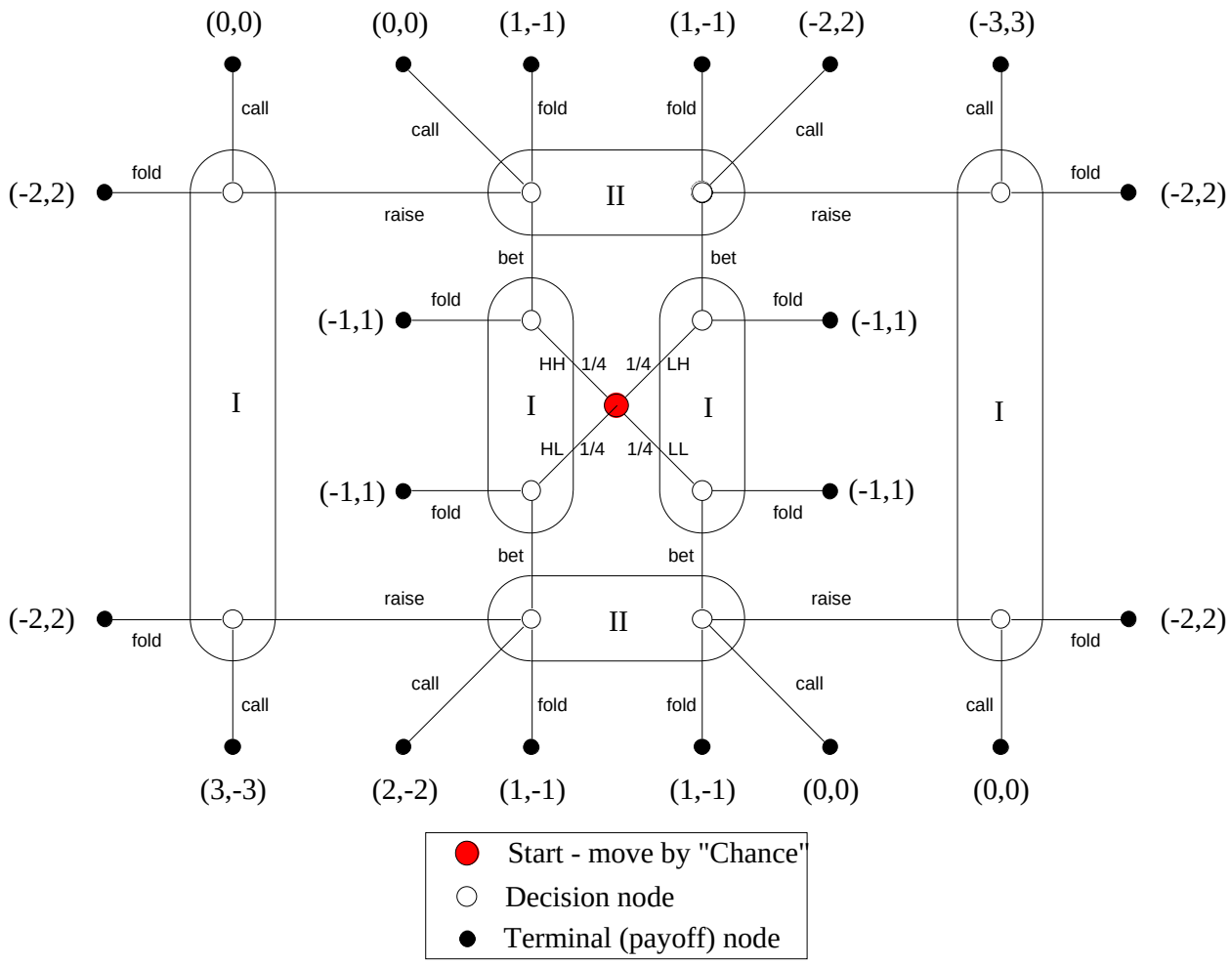
Player I's Strategies		Player II's Strategies
Pure	essentially distinct	
HbcLbc	HbcLbc	
HbcLbf	HbcLbf	
HbcLfc	HbcLf (2)	
HbcLff		
HbfLbc	HbfLbc	
HbfLbf	HbfLbf	
HbfLfc	HbfLf (2)	
HbfLff		
HfcLbc	HfLbc (2)	
HfcLbf	HfLbf (2)	
HfcLfc	HfLf (4)	
HfcLff		
HffLbc		
HffLbf		
HffLfc		
HffLff		



Player I's Strategies

Player II's Strategies

Pure	essentially distinct	undominated
HbcLbc	HbcLbc	HbcLbc
HbcLbf	HbcLbf	HbcLbf
HbcLfc	HbcLf (2)	HbcLf
HbcLff		
HbfLbc	HbfLbc	
HbfLbf	HbfLbf	
HbfLfc	HbfLf (2)	
HbfLff		
HfcLbc	HfLbc (2)	
HfcLbf	HfLbf (2)	
HfcLfc	HfLf (4)	
HfcLff		
HffLbc		
HffLbf		
HffLfc		
HffLff		



Player I's Strategies

Pure

HbcLbc

essentially distinct

HbcLbc

undominated

HbcLbc

HffLbc
HffLbf
HffLfc
HffLff

Player II's Strategies

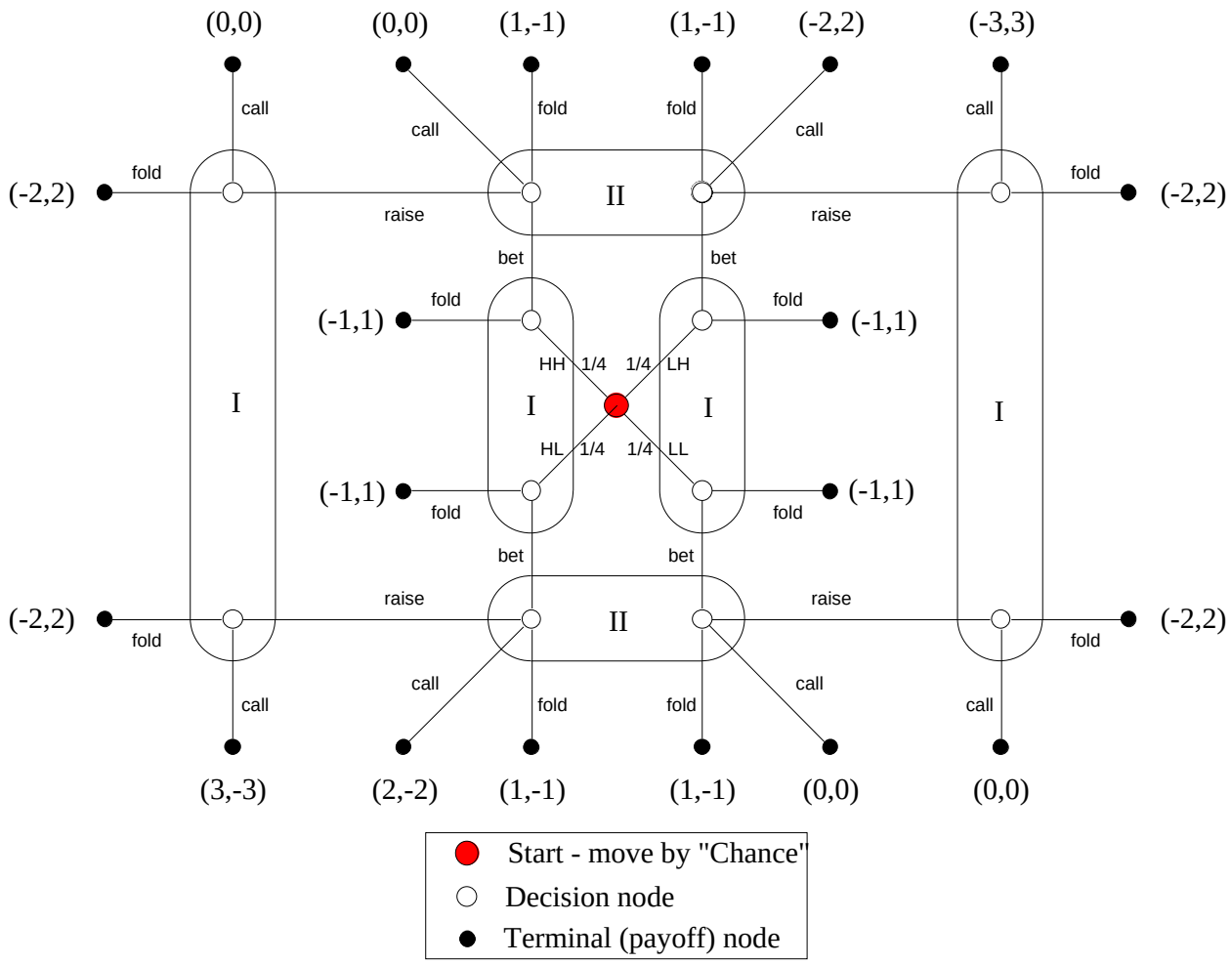
pure

HrLr
HrLc
HrLf
HcLr
HcLc
HcLf
HfLr
HfLc
HfLf

The notation used here (for Player II's strategies) is completely ad hoc. The capital letters are just reminders, and indicate the card held by Player II. The lowercase letters correspond to the player's choice of action in each of the two "situations" the player might be in at some point in the game.

For example, HrLc represents the (single) strategy:

Situation 1 "hold H, heard 'bet'": {**raise**, call, fold}
Situation 2 "hold L, heard 'bet'": {raise, **call**, fold}



Player I's Strategies

Pure	essentially distinct	undominated
HbcLbc	HbcLbc	HbcLbc
HbcLbf	HbcLbf	HbcLbf
HbcLfc	HbcLf (2)	HbcLf
HbcLff		
HbfLbc	HbfLbc	
HbfLbf	HbfLbf	
HbfLfc	HbfLf (2)	
HbfLff		
HfcLbc	HfLbc (2)	
HfcLbf	HfLbf (2)	
HfcLfc	HfLf (4)	
HfcLff		
HffLbc		
HffLbf		
HffLfc		
HffLff		

Player II's Strategies

pure	undominated
HrLr	HrLr
HrLc	HrLc
HrLf	HrLf
HcLr	
HcLc	
HcLf	
HfLr	
HfLc	
HfLf	

Scratchwork

Dealer's payoffs when deal is {HH, HL, LH, LL}
The payoffs combine with probabilities {1/4, 1/4, 1/4, 1/4}

	HrLr	HrLc	HrLf
HbcLbc	0,3,-3,0	0,2,-3,0	0,1,-3,1
HbcLbf	0,3,-2,-2	0,2,-2,0	0,1,-2,1
HbcLf	0,3,-1,-1	0,2,-1,-1	0,1,-1,-1

Nondealer's payoffs when deal is {HH, HL, LH, LL}
The payoffs combine with probabilities {1/4, 1/4, 1/4, 1/4}

	HrLr	HrLc	HrLf
HbcLbc	0,-3,3,0	0,-2,3,0	0,-1,3,-1
HbcLbf	0,-3,2,2	0,-2,2,0	0,-1,2,-1
HbcLf	0,-3,1,1	0,-2,1,1	0,-1,1,1

The Strategic Representation

	HrLr	HrLc	HrLf
HbcLbc	0, 0	-1/4, 1/4	-1/4, 1/4
HbcLbf	-1/4, 1/4	0, 0	0, 0
HbcLf	1/4, -1/4	0, 0	-1/4, 1/4

The Strategic Representation

	HrLr	HrLc	HrLf
HbcLbc	0, 0	-1/4, 1/4	-1/4, 1/4
HbcLbf	-1/4, 1/4	0, 0	0, 0
HbcLf	1/4, -1/4	0, 0	-1/4, 1/4

The Strategic Representation (showing a dominated strategy)

	HrLr	HrLc	HrLf
HbcLbc	0, 0	-1/4, 1/4	-1/4, 1/4
HbcLbf	-1/4, 1/4	0, 0	0, 0
HbcLf	1/4, -1/4	0, 0	-1/4, 1/4

The Strategic Representation (showing another dominated strategy)

	HrLr	HrLc	HrLf
HbcLbc	0, 0	-1/4. 1/4	-1/4, 1/4
HbcLbf	-1/4, 1/4	0, 0	0, 0
HbcLf	1/4, -1/4	0, 0	-1/4, 1/4

The Strategic Representation (after deleting dominated strategies)

	HrLr	HrLf
HbcLbf	-1/4, 1/4	0, 0
HbcLf	1/4, -1/4	-1/4, 1/4

The Strategic Representation (analysis)

	HrLr	HrLf		
HbcLbf	-1/4, 1/4	0, 0	p	if the dealer
HbcLf	1/4, -1/4	-1/4, 1/4	1-p	acts like this

1/4 p - 1/4 (1-p) 0 p + 1/4 (1-p)

the nondealer has these expectations

p* = 2/3 yields expectations of -1/12 (for Player I) for both (of Player II's) column choices (and a lower expected payoff from one of the two columns otherwise)

...

Similarly, q* = 1/3 (on HrLr) yields expectations of +1/12 (for Player II) for both (of Player I's) row choices (and a lower expected payoff from one of the two rows otherwise)

For 0-sum games, the objectives of doing the best you can for yourself, and doing the worst you can against an opponent, coincide. Since the p* and q* strategies yield the same "guaranteed" expected payoff to both players, it makes sense to call these strategies (each on its own!) ***optimal,*** and to call -1/12 the ***value of the game to Player I***.